

REMARKS

Claims 1-3, 5-10, 12 and 14-16 are all the claims presently pending in the application. Claims 1-3, 5-10, 12 and 6 have been amended to more clearly define the invention and claim 17 has been added. Claims 1 and 16-17 are independent.

These amendments are made only to more particularly point out the invention for the Examiner and not for narrowing the scope of the claims or for any reason related to a statutory requirement for patentability.

Applicant also notes that, notwithstanding any claim amendments herein or later during prosecution, Applicant's intent is to encompass equivalents of all claim elements.

Claim 1 stands rejected upon informalities. Claims 1-3, 5-10, 12 and 14-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Takao, et al. (JP 5-81846A), in view of Kau, et al. (U.S. Patent No. 6,421,754).

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

A first exemplary embodiment of the claimed invention is directed to a magnetic disk apparatus which includes a disk enclosure, a first printed-circuit board which is paired with the disk enclosure, and a second printed-circuit board which is detachably connected to the first printed-circuit board via a cable. The first printed-circuit board mounts circuits which have a first noise resistance property, and a circuit which holds parameters unique to the disk enclosure. The second printed-circuit board mounts circuits which have a second noise resistance property which is superior to the first noise resistance property. The second printed circuit board is also detachably connectable to an upper system.

A second exemplary embodiment of the claimed invention is directed to a magnetic disk apparatus which includes a disk enclosure, a first printed-circuit board which is paired with the disk enclosure, and a second printed-circuit board which is connected to the first printed circuit board via a cable and is separated in structure from the first printed-circuit board. The first printed-circuit board mounts circuits having a first noise resistance property, and a circuit which holds parameters unique to the disk enclosure. The second printed circuit board mounts circuits which have a second noise resistance property which is superior to the first noise resistance property. The second printed-circuit board is separated into a third printed circuit board and a fourth printed circuit board in structure. The third printed circuit board is detachably connectable to an upper system and mounts an interface control circuit that interfaces with the upper system. The fourth printed circuit board is separated from an upper system in structure and mounts the circuits other than the interface control circuit.

Conventional magnetic disk apparatus have only a single printed-circuit board for a single disk enclosure. Such single printed-circuit boards mount all of the circuits for controlling the disk enclosure. Thus, when the disk enclosure is exchanged for another disk enclosure, all of the circuits for each disk enclosure must also be exchanged because all of the circuits are on the same single printed-circuit board as the disk. This leads to a wasted cost in replacing all of the circuits for each disk enclosure and maintains a high cost for such a disk exchange. It also limits miniaturization of such a disk enclosure

By contrast, the present invention provides a disk apparatus which includes two separate printed-circuit boards. A first printed-circuit board (e.g., 21 and/or 22 in the exemplary non-limiting embodiment of Fig.2) includes the disk enclosure and is only required to also include those circuits which are unique to the disk enclosure (e.g., such as the

exemplary parameter holding circuit 4 in Fig. 1). A second printed-circuit board (e.g., 23 in the exemplary non-limiting embodiment of Fig. 2) includes other circuits. Thus, when the disk enclosure requires an exchange with another disk enclosure, only those circuits on the first printed-circuit board are exchanged, thereby significantly reducing the cost of the exchange.

Additionally, a first exemplary embodiment of the present invention includes a switch for selecting either of one first printed-circuit board connected to the second printed-circuit board and another first printed-circuit board connected to the second printed-circuit board. Therefore, as shown exemplarily in Fig. 2, this first exemplary embodiment includes 1) one first printed-circuit board (21); and 2) another first printed-circuit board. Both of these are detachably connected to the second printed-circuit board 23. The switch is on the second printed-circuit board 23 and board 23 is detachably connected to an upper system.

In addition to having all of the advantages listed above over the conventional disk apparatus, this configuration enables a single processor 28 to control the two first printed-circuit boards 21 and 22, thereby improving the capacity of the disk apparatus as well as improving the cost ratio of any exchange of the first printed-circuit board.

In the second exemplary embodiment of the invention as recited in independent claim 16, the second circuit board is separated into a third printed circuit board (e.g., 52 in the exemplary non-limiting embodiment of Fig. 3) and a fourth printed circuit board (e.g., 47 in the exemplary non-limiting embodiment of Fig. 3). The third printed circuit board 52 includes an interface control circuit 53 and the fourth printed circuit board 47 includes other circuits, such as a processor 49 and an SPM/VCM control circuit 40. This second exemplary configuration is advantageous over the conventional disk apparatus because it does not

require the entire magnetic disk apparatus to be changed when the interface format changes. Only the third printed circuit board is required to be changed when the interface format changes.

II. THE PRIOR ART REJECTION

Regarding the rejection of claims 1-3, 5-10, 12 and 14-16, the Examiner alleges that the Kau et al. reference would have been combined with the Takao et al. reference to form the claimed invention. Applicant submits, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

Applicant submits that these references would not have been combined as alleged by the Examiner. Indeed, the references are directed to completely different matters and problems.

Specifically, the Takao et al. reference is directed to providing a magnetic disk device with superior portability and good accuracy by providing a first case 2a with a magnetic disk 11, a magnetic head 13, a disk driving means 12 and a head driving means 14 and a second case 2b having a logical operation circuit 6 (Abstract).

In contrast, the Kau et al. reference is specifically directed to a docking station for a laptop computer which provides expandability, quick easy connections to non-portable equipment and a platform by which users can retrofit ISA or EISA add-in cards from a previous installation (col. 10, lines 40 - 55).

Therefore, since the Kau et al. reference is not at all concerned with providing a magnetic disk device having superior portability and good accuracy as disclosed by the Takao

et al. reference, one of ordinary skill in the art would not have been motivated to modify the magnetic disk device disclosed in the Takao et al. reference based upon the features of the docking station disclosed in the Kau et al. reference. Indeed, these references are entirely unrelated and completely different problems and matters. Thus, the references would not have been combined, absent hindsight.

Further, Applicant submits that the Examiner can point to no motivation or suggestion in the references to urge the combination as alleged by the Examiner. Indeed, the Examiner does not even support the combination by identifying a reason for combining the references.

Even assuming arguendo that one of ordinary skill in the art would have been motivated to combine these references, the combination would not teach or suggest each and every element of the claimed invention. Contrary to the Examiner's allegations, the Takao et al. reference does not teach or suggest the features of the present invention including the second printed circuit board being detachably connectable to an upper system.

The Takao et al. reference discloses that the second case 2b is "incorporated into a personal computer main body" and as shown in Figs. 11 and 12. The Examiner refers the Applicant to Figs. 4 and 5 of the Takao et al. reference in an attempt to allege support for a disclosure which shows that the second case 2b is separated from an upper system in structure. However, Figs. 4(a), 4(b), 5(a) and 5(b) clearly show that the second case 2b forms a portion of the upper system.

In particular, Figs. 4(a), 4(b), 5(a) and 5(b) show that the second case 2b has wavy lines on the left side of these figures. Those wavy lines are used to illustrate that the portion being illustrated has been broken away for the purpose of illustration, but that these portions are actually integral with the portion which is not being illustrated.

Therefore, contrary to the Examiner's allegations, the Takao et al. reference does not teach or suggest a second printed circuit board which is detachably connectable to an upper system.

Moreover, the Kau et al. reference, like the Takao et al., does not teach or suggest the features of the present invention including the second printed circuit board being detachably connectable to an upper system. Clearly, this novel feature is not taught or suggested by the Kau et al. reference. Indeed, the Kau et al. reference is completely unrelated to the claimed invention.

Applicant notes that the Examiner refuses to provide any meaning to the words "separated in structure" as recited by the present claims. The Examiner alleges that "none (sic) detailed structural limitation to support the term 'separated in structure' has been found in the specification, figures, and claims. The term 'separated in structure' can be understood in various ways. If two portions have separated elements can also be considered as 'separated in structure.'"

Contrary to the Examiner's allegations, Applicant respectfully submits that the specification, including the claims, the detailed description and the figures provide substantial support for the limitation of "separated in structure." For example, as described in the specification, all of Figs. 1-4 clearly illustrate first printed circuit boards 2, 8, 21, 22 and 42 which are separated in structure from corresponding second printed circuit boards 13, 23, 63 and collectively 47, 52 and 56.

Further, clearly the recitation of a first printed circuit board and a second printed circuit board inherently includes the meaning that two separate printed circuit boards are being used. Should the Examiner continue to allege that this language is not supported, the

Examiner should note that the recitation of "separated in structure" is intended to clarify the intention that the first printed circuit board and the second printed circuit boards are different circuit boards..

Therefore, the Examiner is respectfully requested to withdraw this rejection of claims 1-3, 5-10, 12 and 14-16.

III. FORMAL MATTERS AND CONCLUSION

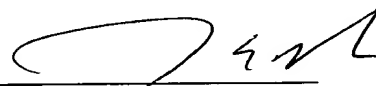
In view of the foregoing amendments and remarks, Applicants respectfully submit that claims 1-3, 5-10, 12 and 14-16, all the claims presently pending in the Application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the Application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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